

IN THE CLAIMS

Claim 1 (original): A method for checking a weld between a first metal pipeline and a second metal pipeline, in particular an austenitic weld, characterized in that the method comprises at least the following method steps:

- a. a first ultrasonic beam is transmitted to an interface between the weld and the first pipeline situated on a first side of the weld;
- b. a reflection of the first ultrasonic beam on the interface situated on the first side of the weld is received and a first received signal corresponding thereto is generated;
- c. a second ultrasonic beam different from the first ultrasonic beam is transmitted to the interface situated on the first side of the weld;
- d. a reflection of the second ultrasonic beam on the interface situated on the first side of the weld is received and a second received signal corresponding thereto is generated;
- e. the first received signal and the second received signal are processed in combination for checking the weld.

Claim 2 (currently amended): A The method according to claim 1, characterized in that the first and the second ultrasonic beam at the interface between the weld and the first pipeline have a mutually different angle of incidence on the interface.

Claim 3 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a. the first ultrasonic beam is directed such that the direction in which the first ultrasonic beam is incident on the interface between the weld and the first pipeline deviates from the normal to a surface of the interface between the weld and the first pipeline at the point where the first ultrasonic beam is incident on the interface.

Claim 4 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a. the first ultrasonic beam is supplied to the interface between the weld and the first pipeline via the first pipeline.

Claim 5 (currently amended): A The method according to claim 4, characterized in that in step a. the first ultrasonic beam is supplied to the first pipeline and propagates via the first pipeline to the weld.

Claim 6 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a. the first ultrasonic beam is supplied to the first pipeline from an outer side of the first pipeline.

Claim 7 (currently amended): A The method according to ~~any one of the preceding claims 1-5~~ claim 1, characterized in that in step a. the first ultrasonic beam is supplied from an inner side of the first or second pipeline.

Claim 8 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a., for the first ultrasonic beam a longitudinal wave is used.

Claim 9 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a. the first ultrasonic beam is focused.

Claim 10 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step a. the transmitted first ultrasonic beam is a pulsed wave.

Claim 11 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step b. the reflection of the first ultrasonic beam is measured that comes from

a direction that deviates from the direction in which the first ultrasonic beam would reflect on the interface according to the rule that the angle of incidence is equal to the angle of reflection, so that the first ultrasonic received signal represents a defraction, if any, of the first ultrasonic beam on the interface between the weld and the first pipeline.

Claim 12 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step b. the reflection of the first ultrasonic beam is measured that comes from a direction which, at least substantially, coincides with the direction in which the first ultrasonic beam is incident on the interface between the first pipeline and the weld.

Claim 13 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that the reflection of the first ultrasonic beam is received on an outer side of the first pipeline.

Claim 14 (currently amended): A The method according to claim 12 ~~or 13~~, characterized in that the first ultrasonic beam is transmitted and received with one and the same probe.

Claim 15 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c. the second ultrasonic beam is directed such that the direction in which the second ultrasonic beam is incident on the interface between the weld and the first pipeline at least substantially does not deviate from the normal to a surface of the interface between the weld and the first pipeline at the point where the second ultrasonic beam is incident on the interface.

Claim 16 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c. the second ultrasonic beam is supplied to the interface between the

weld and the first pipeline via the second pipeline and the weld.

Claim 17 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c. the second ultrasonic beam, after being transmitted, first of all propagates through the second pipeline to an interface between the second pipeline and a second side of the weld situated opposite the first side of the weld, after which the second ultrasonic beam proceeds to propagate through the weld to the interface between the weld and the first pipeline.

Claim 18 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c. the second ultrasonic beam is supplied to the second pipeline from an outer side of the second pipeline.

Claim 19 (currently amended): A The method according to ~~any one of the preceding claims 1-17~~ claim 1, characterized in that in step c. the second ultrasonic beam is supplied to the weld from an inner side of the first or second pipeline.

Claim 20 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c., for the second ultrasonic beam a longitudinal wave is used.

Claim 21 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step c. the second ultrasonic beam is focused.

Claim 22 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that the second ultrasonic beam is a pulsed wave.

Claim 23 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step d. a

reflection of the second ultrasonic beam is measured coming from a direction which, at least substantially, coincides with the direction in which the second ultrasonic beam would reflect on a surface of the interface at the point where the second beam is incident on the interface.

Claim 24 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that the reflection of the second ultrasonic beam is received on an outer side of the second pipeline.

Claim 25 (currently amended): A The method according to claim 23 or 24, characterized in that the second ultrasonic beam is transmitted and received with one and the same probe.

Claim 26 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step e., on the basis of the first and second received signals, it is determined whether the weld comprises a defect.

Claim 27 (currently amended): A The method according to claim 26, characterized in that in step e. it is determined on the basis of the first received signal whether the weld may comprise a defect and it is determined on the basis of the second received signal whether the weld may comprise a defect, it being concluded that the weld actually comprises a defect when both on the basis of the first received signal and on the basis of the second received signal it is concluded that the weld may comprise a defect.

Claim 28 (currently amended): A The method according to claim 27, characterized in that in step e. the amplitude of the first received signal is compared with a first reference to determine whether the weld may comprise a defect and the amplitude of the second received signal is compared with a second reference to determine whether the weld may comprise a defect.

Claim 29 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that the method furthermore comprises at least the following method steps:

f. a third ultrasonic beam is transmitted to the interface between the weld and the first pipeline situated on the first side of the weld;

g. a reflection of the third ultrasonic beam on the interface situated on the first side of the weld, according to the rule that the angle of incidence is equal to the angle of reflection on the surface of the interface between the weld and the first pipeline is received and a third received signal corresponding thereto is generated; and

h. the third received signal is analyzed for checking the weld.

Claim 30 (currently amended): A The method according to claim 29, characterized in that the third beam is directed such that the direction in which the third beam is incident on the interface between the weld and the first pipeline generally deviates from the normal to a surface of the interface between the weld and the first pipeline at the point where the third beam is incident on the interface between the weld and the first pipeline.

Claim 31 (currently amended): A The method according to claim 29 or 30, characterized in that in step f. the third ultrasonic beam is supplied to the interface between the weld and the first pipeline via the first pipeline.

Claim 32 (currently amended): A The method according to claim 29, 30 or 31, characterized in that in step f. the third ultrasonic beam is supplied to the first pipeline and propagates via the first pipeline to the weld.

Claim 33 (currently amended): A The method according to ~~any one of the preceding claims 29-32~~ claim 29, characterized in that in step

f. the third ultrasonic beam is supplied to the first pipeline from an outer side of the first pipeline.

Claim 34 (currently amended): A The method according to ~~any one of the preceding claims 29-33~~ claim 29, characterized in that in step f. the third ultrasonic beam is supplied from an inner side of the first or second pipeline.

Claim 35 (currently amended): A The method according to ~~any one of the preceding claims 29-34~~ claim 29, characterized in that in step f., for the third ultrasonic beam a transverse wave is used.

Claim 36 (currently amended): A The method according to ~~any one of the preceding claims 29-35~~ claim 29, characterized in that in step f. the third ultrasonic beam is focused.

Claim 37 (currently amended): A The method according to ~~any one of the preceding claims 29-36~~ claim 29, characterized in that in step f. the transmitted third ultrasonic beam is a pulsed wave.

Claim 38 (currently amended): A The method according to ~~any one of the preceding claims 29-37~~ claim 29, characterized in that in step g. the reflection of the third ultrasonic beam is measured that comes from a direction which, at least substantially, coincides with the direction in which the third ultrasonic beam would reflect on the interface according to the rule that the angle of incidence is equal to the angle of reflection, so that the third ultrasonic received signal represents a reflection, if any, of the third ultrasonic beam on a possible flaw at the interface between the weld and the first pipeline.

Claim 39 (currently amended): A The method according to claim 38, characterized in that the third ultrasonic beam, after being reflected on the interface between the weld and the first pipeline, propagates to an inner wall of the first pipeline and reflects on

the inner wall of the first pipeline to be subsequently received.

Claim 40 (currently amended): A The method according to ~~any one of the preceding claims 29-39~~ claim 29, characterized in that the third ultrasonic beam is generally received with a different probe than the one it is transmitted with.

Claim 41 (currently amended): A The method according to ~~any one of the preceding claims 29-40~~ claim 29, characterized in that in step g. on the basis of an amplitude of the third received signal, the magnitude of a defect, if any, is determined.

Claim 42 (currently amended): A The method according to claim 41, characterized in that the magnitude of the defect, if any, is determined by comparing the amplitude with a reference.

Claim 43 (currently amended): A The method according to ~~any one of claims 29-42~~ claim 29, characterized in that on the basis of the third received signal the magnitude of the defect is determined if on the basis of the performance of the method step e. it appears that the weld comprises a defect.

Claim 44 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in a step i. a reflection of the second ultrasonic beam on the interface situated on the first side of the weld is received according to the rule that the angle of incidence is equal to the angle of reflection on the surface of the interface between the weld and the first pipeline is received and a fifth received signal corresponding thereto is generated.

Claim 45 (currently amended): A The method according to claim 44, characterized in that in a step j. on the basis of an amplitude of the fifth received signal obtained in step h., the magnitude of a defect, if any, is determined.

Claim 46 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that in step b. also a reflection of the first ultrasonic beam on an interface of the weld between the weld and the second pipeline is measured to obtain the first received signal and that a fourth ultrasonic beam is supplied to the interface of the weld between the weld and the second pipeline to obtain a fourth received signal, while the first and the fourth ultrasonic beams at the interface between the weld and the second pipeline have a mutually different angle of incidence on the interface between the weld and the second pipeline, and the first received signal and the fourth received signal are processed in combination for checking the interface between the weld and the second pipeline, in particular to determine whether the interface between the weld and the second pipeline comprises a defect.

Claim 47 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that an interface between the weld and the second pipeline is checked as the interface between the first pipeline and the weld is checked, while the first ultrasonic beam is also used for checking the interface between the second pipeline and the weld in a same way as the second ultrasonic beam is used for checking the interface between the weld and the first pipeline.

Claim 48 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that an interface between the weld and the second pipeline is checked as the interface between the first pipeline and the weld is checked, while the second ultrasonic beam is also used for checking the interface between the second pipeline and the weld in a same way as the first ultrasonic beam is used for checking the interface between the weld and the first pipeline.

Claim 49 (currently amended): A The method according to ~~any one of~~

~~the preceding claims~~ claim 1, characterized in that the first ultrasonic beam and the second ultrasonic beam are incident at least substantially on a same area of the interface between the first pipeline and the weld in order for this area of the interface to be checked.

Claim 50 (currently amended): A The method according to ~~any one of claims 29-43 and according to claim 49~~ claim 29, characterized in that the third ultrasonic beam is incident at least substantially on the same said area.

Claim 51 (currently amended): A The method according to ~~any one of the preceding claims~~ claim 1, characterized in that the first ultrasonic beam and the second ultrasonic beam are directed to a same area of the interface between the first pipeline and the weld.

Claim 52 (currently amended): A The method according to ~~any one of claims 29-43 and according to claim 51~~ claim 29, characterized in that the third ultrasonic beam is directed to said area of the interface between the first pipeline and the weld.